

4.16 Visual Impacts

Impacts to visual resources consist of the amount of visual change along S.R. 108 and the effects of these changes on viewers who would see those changes. Certain land uses, including residential and recreation areas and publicly used lands, are considered to be more sensitive to visual changes.

4.16.1 No-Action Alternative

4.16.1.1 Construction Impacts

Under the No-Action Alternative, S.R. 108 would remain at its current width. Because no major roadway improvements would be made, no large topographic changes or soil disturbances from construction-related cuts and fills would occur. However, commercial and residential construction will continue to occur along S.R. 108, which will result in typical construction views: cleared and graded parcels, construction equipment, construction fencing, and construction materials.

4.16.1.2 Long-Term Impacts

Under the No-Action Alternative, S.R. 108 would remain at its current width. The long-term visual impacts of the No-Action Alternative would come from continued commercial and residential development.

With or without the S.R. 108 project, views near Syracuse, West Point, Clinton, Roy, and West Haven would change as development occurs. Most of the agricultural areas along S.R. 108 are planned for development in the cities' land-use plans (see Section 3.1, Land Use). Representatives of the jurisdictions believe that the current types and rates of land use and development will continue with or without the project (S. Anderson 2006a; Anderson and Davis 2006; Larson 2006a; Vinzant 2006; Worthen 2006). Given these assumptions, the views along the corridor would also continue to change to those of a more urban environment with or without the project.

What is the visual impact analysis area?

The visual impact analysis area includes S.R. 108 and its viewshed. The viewshed is all areas from which physical changes associated with the proposed alternatives could be seen.



4.16.2 Minimize 4(f) Impacts Alternative

4.16.2.1 Construction Impacts

Under the Minimize 4(f) Impacts Alternative, short-term construction-related impacts would include construction vehicle activity and accompanying staging areas, stockpiling of excavated material, traffic congestion, and construction-related dust. Construction impacts would occur everywhere that improvements are made along S.R. 108, but because the project would be completed in three phases over a 6-year period, only specific segments of S.R. 108 would experience construction-related impacts at any given time.

During construction, the work zone would be cleared of vegetation. The exposed bare ground would likely contrast visually with the surrounding agricultural, residential, and/or commercial areas that the viewer is used to seeing. Visual quality from sensitive viewer locations (such as residences next to S.R. 108) would be temporarily reduced during construction and would include the presence of construction equipment and staging and storage areas. Until the construction is completed and the disturbed areas are revegetated or become part of the roadway section, the construction areas would stand out.

4.16.2.2 Long-Term Impacts

The Minimize 4(f) Impacts Alternative would not substantially alter the general visual conditions along S.R. 108. Most changes would be due to the increased pavement width as the existing two-lane road is widened to five lanes. This change requires a larger right-of-way footprint (110 feet), which would bring S.R. 108 closer to buildings that currently line the roadway. It would also increase the visual dominance and scale of S.R. 108 as viewed from nearby locations, particularly residences, churches, businesses, and schools.

Other changes would include cut-and-fill slopes, loss of mature trees and vegetation, replacement of existing drainage structures, the potential addition of noise walls between 3600 South and 4000 South, and removal of residential and commercial structures, fencing, and landscaping. However, these impacts would occur along

the existing roadway and would not be the result of a new transportation corridor.

There are a few remaining farm fields and open-space areas along S.R. 108 where development has not occurred. Some of this open space would be acquired by UDOT to build a larger roadway, and much of the remaining open space is either already scheduled for development or soon will be developed in accordance with the cities' land-use plans.

In general, the Minimize 4(f) Impacts Alternative would likely have positive effects on the visual aesthetics of the study area and its surroundings, especially on the foreground and middle-ground views described in Section 3.16.3, Foreground and Middle-Ground Views. The existing S.R. 108 roadway is not uniform in design and provides an undesirable mix of improved and unimproved sections due to the ongoing commercial and residential development in the area. Sections of S.R. 108 that have been developed typically have new sidewalks, landscaping, and street lighting, while sections of S.R. 108 that haven't been recently developed have dirt shoulders and no sidewalks or lighting. The addition of consistent design elements including park strips, sidewalks, medians, and permanent landscaping/aesthetic enhancements could enhance the visual conditions along S.R. 108.

UDOT would use context-sensitive design to ensure that any new design elements along S.R. 108 would complement the design of adjacent properties. For instance, the visual character of potential noise barriers in relationship to their environmental setting would be carefully considered. In general, it is desirable to locate a noise barrier at a distance from residences approximately four times its height and to provide landscaping near the barrier to prevent it from visually dominating the area. Additionally, noise barriers should reflect the character of their surroundings as much as possible.

For the most part, there would be no change to the background views described in Section 3.16.2, Background Views. While it is always desirable to preserve aesthetic views and scenic vistas to the extent possible, for residents between 3600 South and 4000 South and near the new townhomes just south of 1900 West, views could be blocked to some extent due to the potential addition of 8-foot-high to 18-foot-high noise walls.



4.16.3 West Alternative

The visual impacts from the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.16.4 Mitigation Measures for Visual Impacts

During the preliminary design of the project, several mitigation measures were considered to reduce the visual impacts of the alternatives. Additional aesthetic measures such as lighting, vegetation and plantings, and other architectural features will be considered during the final design of the project. Landscape plans for the roadway will include replacement landscaping to reduce impacts from the loss of vegetation.

4.17 Cumulative Impacts

The cumulative impact analysis was prepared according to the requirements of the NEPA regulations and guidance from CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997). The CEQ regulations (40 CFR 1500–1508) that implement the procedural provisions of NEPA define cumulative impacts as:

The impact on the environment which results from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal, or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Cumulative impacts include both direct and indirect impacts.

4.17.1 Cumulative Impacts Study Area and Elements

According to CEQ's cumulative impacts guidance, the cumulative impact analysis should be narrowed to focus on important issues at the national, regional, or local level. The analysis should look at other actions that could have similar effects and should analyze whether a particular resource has been historically affected by cumulative actions.

As discussed in Chapter 1, Purpose of and Need for Action, the project area is focused on the segment of S.R. 108 between Antelope Drive on the south and 1900 West on the north (see Exhibit 1.1-1, S.R. 108 Study Area). The area of potential impacts for the cumulative impact analysis is the project area; commercial, residential, and agricultural land on either side of S.R. 108; and areas beyond the corridor that could be directly or indirectly affected by changes to S.R. 108. The timeframe for this analysis is through the year 2035.

Over time, the communities of Syracuse, West Point, Clinton, Roy, and West Haven have transitioned from open land with minimal development and farmlands to an area with commercial and residential development and limited farmlands. This development trend is continuing as existing open areas are converted to residential and commercial development in accordance with local plans and policies.

The reasonably foreseeable future actions within the timeframe of the analysis are development that follows the five cities' adopted land-use and transportation plans. As noted in Section 3.1, Land Use, all of the cities along the corridor are expected to reach full build-out by 2030 except for West Point, which is expected to reach full build-out by 2035. The precise timing of the future development is unknown.

The general plans of Syracuse, Clinton, Roy, and West Haven each address the ultimate width of S.R. 108 (City of Roy 2005; City of West Haven 2005; City of Syracuse 2006b; City of Clinton 2006a). The Syracuse plan calls for a 110-foot-wide right-of-way. The Clinton and Roy plans call for specific numbers of lanes: five total lanes for Clinton and four travel lanes for Roy. Finally, the West Haven plan calls for a 100-foot-wide to 110-foot-wide roadway. The West Point general plan does not address the ultimate configuration of S.R. 108. Other improvements identified by the cities are summarized in Exhibit 4.17-1 below.

What is build-out?

Build-out means that there is no more land available for development because any undeveloped land is already being used for its intended use of open space, agriculture, or other defined uses.

However, build-out rarely means the end of development in a city, because parcels of land can be redeveloped and a city can add to its existing land base by annexing adjacent parcels.



Exhibit 4.17-1: Proposed New Transportation Facilities near S.R. 108

City/Jurisdiction	Street/Facility	Improvement
Syracuse	Legacy Parkway	Reserve right-of-way, interchange at 1700 South
	Bluff Road	Install traffic circle at 1000 West
	200 South	New major arterial (110 feet wide)
West Point	Legacy Parkway	Reserve right-of-way; possible construction
Clinton	800 North	Three lanes for entire length in city; install roundabouts at 3000 West and 1500 West
	1300 North	New signal at S.R. 108; install roundabouts at 3000 West, 1500 West, and 1000 West
	1800 North	Five lanes for entire length in city; install new signals at 3000 West, about 1700 West, and 1500 West
	2200 West (approximate location)	Build new roadway between 800 North and 1500 North and between 1800 North and about 2100 North
Roy	Various	New and reconstructed short segments of local and collector streets throughout city
	Hinckley Drive Extension ^a	New roadway from 1900 West to S.R. 108
West Haven	2100 South	New 100-foot to 110-foot arterial from 1900 West to 4700 West (which is outside the West Haven city limit)
	4700 West	New 100-foot to 110-foot arterial from about 4600 South to southern city limit and beyond (outside city limit, no end point identified)

Sources: City of West Point 2005; City of Roy 2005; City of West Haven 2005; City of Clinton 2006a; City of Syracuse 2006b

^a Also extends into West Haven. The new extension is shown on the future transportation system maps for both Roy and West Haven.

S.R. 108 is an important connector to Antelope Drive (also known as 1700 South), which in turn is an important connector to I-15.

Improvements to S.R. 108 need to be considered in conjunction with any proposed improvements to Antelope Drive and other potential connections to I-15, such as the new 200 South arterial in Syracuse and the Hinckley Drive extension in Roy and West Haven. Antelope Drive and perhaps other east-west roadways will also connect to the anticipated northern extension of the Legacy Parkway when that project is completed.

4.17.2 Cumulative Impact Analysis

The proposed project itself would not directly or indirectly affect regionally and locally important resources such as water quality, threatened or endangered species, and air quality, so the project would not contribute to cumulative impacts to these resources. The

proposed project would affect about 16 acres of pastureland that could be used by wildlife; however, most of this pastureland does not have shrubs or trees and provides low-value wildlife habitat. The project would also result in the loss of about 11 acres of farmland adjacent to S.R. 108. This would result in less than 1% loss of the farmland in Davis and Weber Counties and less than 1% loss of the farmland along S.R. 108. As described in the sections of this chapter on these resources, continued regional growth and development will have cumulative impacts on these resources. The project could affect about 0.025 acre of wetlands. As discussed below, the project area has been and continues to be converted from open/agricultural uses to urban at a rapid pace, resulting in the cumulative loss of wetlands. Although the S.R. 108 project would result in 0.025 acre of impact (less than 1% of the wetlands in the region), this minor contribution to the cumulative impact would be mitigated and therefore would not substantially contribute to regional wetland cumulative impacts.

The proposed roadway width is consistent with the cities' plans for S.R. 108 and each of the cities' transportation plans. As noted in Section 3.1, Land Use, city representatives believe that residential and commercial growth along the corridor will continue with or without the proposed project, although the project could affect the timing of the development adjacent to S.R. 108. As described in Section 4.1, Land Use Impacts, there are two reasons for assuming that the area will develop to full build-out with or without the S.R. 108 project: (1) past trends that show numerous new developments being built in the last 3 years, and (2) the expected continued rapid growth in both population and employment within the five cities that border the project.

The S.R. 108 project would result in localized community impacts (social impacts), particularly during construction. These impacts are not expected to extend beyond the S.R. 108 corridor or affect the cohesiveness or quality of life for residents of the entire region. Residents of the area know that their communities are growing, that the area is becoming more urbanized, and that such growth would occur with or without the project (45% of respondents to the Community Profile Survey believe that the characteristics of their community will change over time with or without improvements to S.R. 108). Many residents do not like the change, but they understand that it is coming. The S.R. 108 project would contribute



to residents' feelings that the area is growing and changing, but this growth and change would occur regardless of the project. The growth could also change the nature of the community by removing many of the older residential structures, some of which are older than 50 years. For the S.R. 108 project, up to 22 potentially historic homes would be affected, and many developers are buying older houses and replacing them with commercial developments or newer residential areas.

The portions of Davis and Weber Counties near I-15 are growing rapidly. One reason why people who work in Salt Lake City or Ogden choose to live in Syracuse, West Point, Clinton, Roy, or West Haven is that the cost of living is more affordable. The cities' transportation plans for the area are designed to accommodate the expected residential and non-residential growth. UDOT and its planning partners, such as WFRC and UTA, also recognize the growth trends and have plans for regional solutions to the anticipated future transportation challenges. The S.R. 108 project would not contribute substantially to environmental impacts from the type of local and regional transportation planning that is being considered by the cities, counties, and UDOT and its partners.

4.18 Indirect Impacts

CEQ regulations for implementing NEPA require that an EIS analyze the direct and indirect effects of the proposed action. Indirect effects are defined by the CEQ regulations (40 CFR 1508.8) as effects

which are caused by the [proposed] action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to the induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

For this project, indirect effects are defined as effects that could result from the project beyond direct impacts to property and resources within the project right-of-way and the construction footprint. In this analysis, indirect effects are those that result from induced development, which could occur in the S.R. 108 study area due to the improved accessibility and mobility from the project.

What is induced development?

Induced development is development that occurs because a roadway project makes it easier for residents to live farther from destinations such as employment and shopping. Induced development can change the pattern of land uses, population density, or growth rates in the project's study area.

Indirect effects to natural resources such as vegetation and wildlife would typically be caused by the conversion of undeveloped and partially developed land to other land uses. Indirect impacts other than impacts to growth, development, and travel demand are described under the individual resource sections in this chapter.

4.18.1 Indirect Impact Analysis

The S.R. 108 project is not expected to induce local or regional growth. The proposed roadway widening is consistent with the cities' land use or transportation plans for S.R. 108. As noted in Section 4.1.1.1, Impacts on Existing Land Use, city representatives believe that residential and nonresidential growth along the corridor will continue with or without the project and that improvements to S.R. 108 would not change the rate of growth or types of developments in their communities, although the type and timing of growth adjacent to S.R. 108 could change. In addition, no indirect impacts from roadway construction or operation on the environmental resources analyzed in this EIS have been identified.

As noted in Section 3.1, Land Use, the cities along S.R. 108 plan to develop the corridor with more commercial uses to support the growing residential areas. An improved S.R. 108 would provide more opportunities for residents to shop locally instead of traveling to the main commercial corridor, S.R. 126, about 2 miles to the east. Reduced congestion on S.R. 108 would allow improved commercial access. Local residents could shop closer to home, which would reduce travel times and distances in the region compared to the No-Action Alternative. With the reduced travel distances and times, the S.R. 108 improvements would not cause indirect impacts to the transportation system compared to the No-Action Alternative.

4.19 Energy Impacts

NEPA regulations (40 CFR 1502.16) require an examination of the energy requirements of a proposed project and the potential of the project for conserving energy. This section describes how energy demands would be affected in the short term and long term under the No-Action and action alternatives. Energy is evaluated primarily in the form of vehicle fuel consumption.

How is energy evaluated in this EIS?

In this EIS, energy is evaluated primarily in the form of vehicle fuel consumption.



Fuel consumption varies with traffic characteristics. The primary traffic characteristics are traffic flow (average vehicle speed), driver behavior, the geometric configuration of the roadway, the vehicle mix (cars versus trucks), and climate and weather. Of all the traffic-related factors, average vehicle speed accounts for most of the variability in fuel consumption and is a good predictor of fuel economy for most urban travel. Fuel efficiency under steady-flow, “cruising” driving conditions peaks at 45 mph to 60 mph and then rapidly declines as speeds increase. At lower speeds, fuel efficiency is reduced by engine friction, under-inflated tires, use of powered accessories (such as power steering and air conditioning), and repeated braking and acceleration (Davis and Diegel 2003).

4.19.1 No-Action Alternative

4.19.1.1 Construction-Related Energy Impacts

Under the No-Action Alternative, the only construction-related energy impacts would be caused by roadway maintenance and any roadway work that occurs as part of ongoing commercial and residential development along S.R. 108.

4.19.1.2 Direct Energy Impacts

Under the No-Action Alternative, increased traffic and congestion, coupled with stop-and-go traffic from the projected growth in the region, would increase overall energy requirements under the No-Action Alternative compared to existing conditions.

4.19.2 Minimize 4(f) Impacts Alternative

4.19.2.1 Construction-Related Energy Impacts

Constructing the Minimize 4(f) Impacts Alternative would involve the operation of heavy machinery with a resulting negative impact on energy use since fuel would be consumed as part of the construction activities. In addition, traffic congestion would increase during construction, so more fuel would be used.

4.19.2.2 Direct Energy Impacts

Under the Minimize 4(f) Impacts Alternative, some congestion would be relieved on S.R. 108, which would increase average

vehicle speeds and fuel efficiency. Based on the results of travel demand modeling, the Minimize 4(f) Impacts Alternative might cause a slight increase in the vehicle-miles traveled along S.R. 108 but would not change the vehicle-miles traveled in the region. However, the overall impact to energy consumption would not produce any beneficial or adverse impacts.

4.19.3 West Alternative

Impacts to energy consumption under the West Alternative would be the same as those from the Minimize 4(f) Impacts Alternative.

4.20 Construction Impacts

Construction of either of the action alternatives would cause temporary construction-related impacts due to ground disturbance and the operation of construction equipment. Construction could also cause impacts to air quality, water quality, noise and vibration levels, light levels, visual resources, cultural resources, wildlife, vehicle flow (business operations), utility service, and hazardous material sites.

The nature and timing of these impacts would be related to the project's construction methods and phasing. As proposed, the improvements would be made to S.R. 108 as funding becomes available. Most construction-related impacts to the public would be associated with travel delays on local surface streets.

4.20.1 No-Action Alternative

Under the No-Action Alternative, S.R. 108 would not be reconstructed, so there would be no construction-related impacts from the project. However, as farmland is developed for commercial and residential uses along S.R. 108, the developer would make sure that homes are set back an appropriate distance from S.R. 108 and would include curb and gutter for the new development according to UDOT and local ordinances.

4.20.2 Action Alternatives

The action alternatives would make improvements to S.R. 108 along the existing corridor. The improvements would be made in three



phases over a 6-year period as funding becomes available. Overall, most of the construction-related impacts would be temporary and would not result in long-term impacts. The following discussion of impacts applies to both of the action alternatives unless otherwise stated.

A thorough public information program would be implemented to inform the public about construction activities and to minimize impacts. Information would include work hours and alternate routes. Construction signs would be used to notify motorists about work activities and changes in traffic patterns. In addition, night and weekend work could be scheduled to shorten the duration of construction impacts as long as permit requirements are satisfied.

4.20.2.1 Construction Phasing

Because of the uncertainty of obtaining funding for the project, the exact timeline and location for construction cannot be determined. Initial construction could start as early as 2010.

4.20.2.2 Air Quality Construction Impacts

Air quality impacts during construction would be limited to short-term increases in fugitive dust, particulates, and localized pollutant emissions from construction equipment. The project would generate pollutant emissions from the following construction activities:

- Excavation related to cut-and-cover
- Mobile emissions from construction workers' vehicles as they travel to and from the project site
- Mobile emissions from delivering and hauling construction supplies and debris to and from the project site
- Stationary emissions from onsite construction equipment
- Mobile emissions from vehicles whose speeds are slowed because of increased congestion caused by construction of S.R. 108

Because S.R. 108 would be constructed in phases, it is difficult to determine emissions associated with construction. Because construction would be localized and short-term, any impacts to individual air

quality receptors would also be short-term. The most common type of air pollutant resulting from construction would be PM₁₀.

4.20.2.3 Water Quality Construction Impacts

Excavating, grading, and other construction activities could reduce water quality during construction. These impacts would continue until the proposed project is completed and permanent protective measures are installed.

4.20.2.4 Noise Construction Impacts

The operation of machinery and other construction activities would increase noise levels. Construction would cause temporary increases in noise levels in the communities along S.R. 108, but the impacts would be short-term. Construction equipment could generate noise levels near residences of 80 dBA to 90 dBA or similar to that of a heavy truck at 50 feet.

4.20.2.5 Visual Construction Impacts

During construction, the work zone would be cleared of vegetation and the exposed bare ground would contrast visually with the surrounding agricultural, recreational, and residential areas that viewers of the area are accustomed to seeing. In addition, construction equipment and materials would clutter views in the construction area. Visual quality from sensitive viewer locations such as homes and parks would be temporarily reduced during construction. Until construction is completed and the right-of-way is revegetated, the construction area would visually stand out.

4.20.2.6 Utility Service Construction Impacts

Although utility service would be maintained throughout most construction activities, utility service could be temporarily disrupted during construction. The affected utilities could include electric, gas, water, sewer, phone, cable, and storm drainage. UDOT would consult with all utility providers affected by construction to complete utility agreements before construction, and the construction contractor would coordinate with all utility providers to minimize utility service interruptions.



4.20.2.7 Traffic Construction Impacts

The primary construction impacts that would affect vehicle traffic, pedestrians, and bicyclists during construction of either of the action alternatives are the following:

- Traffic detours and some temporary road closures would change frequently throughout construction. Changes in roadway conditions could include rerouting of traffic onto other roads, temporary closure of lanes or sections, and temporary lane shifts. These conditions could occur both on S.R. 108 and on minor cross-streets and at major intersections. Detours and road closures would temporarily increase vehicle commute times, fuel usage, and air pollutant emissions.
- Access to residential and commercial properties and community facilities such as schools would be temporarily disrupted, resulting in longer commute times and a potential loss of business for some commercial businesses.

4.20.2.8 Economics Construction Impacts

Construction activities could temporarily affect access to businesses in the construction area. Although access to properties would be maintained to the extent practicable, temporary detours would limit some access or change the route to some businesses. The resulting traffic congestion and motorists' perceptions of inaccessibility could discourage some shoppers from patronizing businesses in the construction area.

A Business Profile Survey for S.R. 108 Improvements was hand-delivered to all businesses along S.R. 108 in November 2006. Many business owners expressed concern that the construction along S.R. 108 would affect access to their business and their sales. Research shows that concerns raised over the potential loss of sales during construction are legitimate. Studies suggest that sales can decline 10% to 60% depending on the nature of the business, the length of time of construction, the length of time that the business has been in operation, the location of the business, alternate access routes to the business, and other factors.

With the likely loss of sales to the businesses along S.R. 108 during construction, the sales tax revenue generated by the businesses on

S.R. 108 would also decline. However, most survey respondents who were concerned about accessibility and sales during construction also stated that, in the long term, an improved S.R. 108 would help their businesses since congestion and accessibility along S.R. 108 would be improved.

The businesses most likely to be affected are those that cater to impulse shopping or “in-route” shopping. Fast-food restaurants and gas stations belong to this first group and are considered businesses that would be highly affected by construction. Destination businesses that have extensive competition, such as grocery stores, hardware stores, and “sit-down” restaurants, would be the next-most-affected group and are therefore considered businesses that would be moderately affected by construction.

Low-impact businesses include specialty and unique stores; these businesses are likely to be only slightly affected by construction. The fourth group of businesses, which includes offices, industrial parks, schools, and churches, is not expected to be affected. Construction activities would most likely not affect this group’s day-to-day operations since consumer traffic generally does not sustain their business activities.

4.20.2.9 Hazardous Materials Construction Impacts

Construction workers could encounter soil contamination from underground storage tanks, leaking underground storage tanks, and other hazardous material sites that might be near S.R. 108. Exposure to these sites could pose a health risk. Because the general public would not be allowed onto construction sites, there would be no health risks to the public from ground contamination.



4.20.2.10 Construction Staging and Material Borrow Areas

During construction, the contractor would establish staging areas for equipment and would obtain fill material for S.R. 108 improvements. Because a contractor has not yet been selected, the exact location of staging areas and sources of fill material is not known.

4.20.2.11 Invasive Species Construction Impacts

Construction operations would remove the existing hard surfaces and established vegetation, which would expose the underlying soils to the risk of being infiltrated by invasive weeds. Materials and equipment delivered to the job site could introduce invasive weeds into the area if seeds are present in imported soil or on equipment that is not properly cleaned.

4.20.3 Mitigation Measures for Construction Impacts

The following mitigation measures will be implemented during construction.

4.20.3.1 Mitigation Measures for Public Impacts Due to Construction

A thorough public information program will be implemented to inform the public about construction activities and to minimize impacts. Information will include work hours and alternate routes. Construction signs will be used along the corridor to notify motorists about work activities and changes in traffic patterns.

Impacts from lights used during nighttime construction will be minimized by aiming construction lights directly at the work area and/or shielding the lights. Utility agreements will be completed to coordinate utility relocations.

4.20.3.2 Mitigation Measures for Air Quality Impacts due to Construction

The contractor will be required to provide the following mitigation measures to preserve air quality during construction:

- **Fugitive-Dust Control.** The contractor will maintain a fugitive-dust-control program. This program will include wetting excavation areas, unpaved parking and staging areas, and onsite stockpiles of debris, dirt, or dusty material to reduce windblown dust.
- **Street Sweeping.** The contractor will use street-sweeping equipment where needed.
- **Equipment Emissions.** The contractor will shut off construction equipment when it is not in direct use to reduce emissions from idling.

Other mitigation measures that could be implemented to minimize air quality impacts include the following:

- Use newer, cleaner-emitting construction equipment and properly maintain the equipment.
- Install control equipment on diesel construction equipment (such as particulate filters or traps, oxidizing soot filters, and oxidation catalysts) to the extent that is feasible.
- Reroute truck traffic away from schools and communities when reasonably practical.
- Consider the use of alternate engines and diesel fuels such as electric engines, engines that use liquefied or compressed natural gas, diesel engines that meet EPA 2007 regulations, diesel engines fueled with low-sulfur fuel, and diesel engines outfitted with catalyzed diesel particulate filters and fueled with low-sulfur fuel (less than 15 ppm sulfur).



4.20.3.3 Mitigation Measures for Water Quality Impacts due to Construction

To minimize the temporary impacts to water quality, a UPDES General Storm Water Discharge Permit will be required. As part of the requirements of the permit, the contractor will be required to develop and implement a Storm Water Pollution Prevention Plan. The plan will contain provisions for controlling the stormwater in the project area to reduce erosion and siltation.

4.20.3.4 Mitigation Measures for Noise Impacts due to Construction

To reduce temporary noise impacts associated with construction, the contractor will comply with all state and local regulations relating to construction noise. Measures for reducing construction noise include limiting construction in residential areas during nighttime hours, locating rock-crushing activities away from residential areas, and placing temporary barriers. Each construction area will be evaluated for the appropriate measures to use.

4.20.3.5 Mitigation Measures for Visual Impacts due to Construction

The contractor will prepare and implement an appropriate seeding vegetation and/or landscaping plan to restore or enhance aesthetics at the completion of the project. The contractor will also be required to maintain and keep the storage area for equipment, materials, and other accessories in a reasonable condition of cleanliness and orderly placement to avoid an unpleasant appearance. The contractor will promptly remove unused or unnecessary traffic-control equipment.

4.20.3.6 Mitigation Measures for Utility Service Impacts due to Construction

The project specifications will require the contractor to coordinate with the utility companies to plan work activities so that utility disruptions to a business occur when the business is closed or during off-peak times. Before beginning work, the contractor is required to contact Blue Stakes to identify the location of all utilities. The contractor will be required to use care when excavating to avoid unplanned utility disruptions. If utilities are unintentionally

disrupted, UDOT will work with the contractor and the utility companies to restore service as quickly as possible.

4.20.3.7 Mitigation Measures for Traffic Impacts due to Construction

The contractor will be required to develop a maintenance of traffic plan that defines measures to minimize construction impacts on traffic. A general requirement of this plan is that, to the extent reasonably practical, safe access to businesses and residences must be maintained and existing roads must be kept open to traffic unless alternate routes are provided. However, prior to construction of each phase, the project team will coordinate with business and property owners to identify where temporary access can be shared and to define timeframes (such as night) when access is not needed. Signs will be placed to notify motorists where business access is provided. Finally, information will be made available to the public detailing construction activities and providing alternate transportation routes.

Even with the implementation of the maintenance of traffic plan, short-term increases in traffic congestion would occur in the vicinity of S.R. 108 construction. Street closures would be limited to what is specified in the maintenance of traffic plan as approved by UDOT before the start of construction.

4.20.3.8 Mitigation Measures for Economic Impacts due to Construction

Access to businesses will be maintained during the construction and post-construction phases of this project, as this is UDOT's policy with respect to access issues on all UDOT roadway improvement projects. For each phase of the project, the project team will coordinate with property owners and businesses to evaluate ways to maintain access while still allowing efficient construction operations. This could entail sharing temporary access or identifying acceptable timeframes when access is not needed. Adequate signage will be placed in construction areas to direct motorists to businesses and industrial areas. Other potential mitigation measures for construction impacts include:



- Provide a frequent newsletter to all businesses along S.R. 108 describing the progress of the construction and upcoming construction events.
- Provide business access signs along S.R. 108 that identify business access points within the construction limits.
- Hold a monthly meeting with business owners to inform them of upcoming construction activities and to provide a forum for the businesses to express their concerns with the project.
- To minimize noise and light impacts at night, conduct major construction activities in residential areas during the day.

4.20.3.9 Mitigation Measures for Hazardous Materials Impacts due to Construction

To minimize the risk of exposure to hazardous materials, the UDOT project team will coordinate with DERR, the construction contractor, and the appropriate property owners. This coordination will involve determining the status of the sites of concern, identifying newly created sites, identifying the nature and extent of remaining contamination (if any), and minimizing the risk to all parties involved.

Measures will be implemented to prevent the spread of contamination and to limit worker exposure. Site investigations will determine the chemical hazard, if any, and the appropriate protection measures. In the case of an identified chemical hazard, the site remedy will be negotiated through coordination with DERR.

Previously unidentified sites or contamination could be encountered during construction. In such a case, all work will stop in the area of the contamination according to UDOT Standard Specifications, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous wastes will be handled according to UDOT Standard Specifications and the requirements and regulations of UDEQ.

4.20.3.10 Mitigation Measures for Construction Staging and Material Borrow Areas

Earth-disturbing activities are generally confined to the limits of cut and fill, although staging areas and some construction activity might

be located outside the limits of cut and fill. Any staging areas or construction fill material areas will need to be coordinated with UDOT to ensure that no sensitive environmental resources are affected. The contractor will limit impacts and restore any disturbed vegetation or other improvements within the selected staging areas.

4.20.3.11 Mitigation Measures for Invasive Species Impacts due to Construction

To mitigate the possible introduction of invasive weeds due to construction activities, the invasive weed BMPs in UDOT's current Standard Specifications for Road and Bridge Construction will be implemented and monitored and included in the plans and specifications for the project.

- The contractor will be required to follow noxious weed mitigation and control measures identified in UDOT Standard Specifications for Invasive Weed Control.
- Strictly following BMPs will also reduce the potential for weed infestations.
- Reseeding with native plants, followed by monitoring seedlings and invasive species until the vegetation has re-established, will mitigate direct-disturbance impacts and reduce the potential for weed invasions. UDOT will be responsible for monitoring and determining when vegetation becomes re-established.

4.21 Short-Term Uses versus Long-Term Productivity

The short-term use of the environment versus preserving its long-term productivity is related to converting the natural productivity of the land, a renewable use, to a developed use that has a relatively short economic life. Improvements to S.R. 108 would be consistent with the local land-use and transportation plans and are consistent with regional projections of increases in population. Because most of the study area is already developed, the action alternatives would not alter the long-term productivity of the area.



4.22 Irreversible and Irretrievable Commitment of Resources

Implementing an action alternative involves a commitment of a range of natural, physical, human, and fiscal resources. Land used for constructing the S.R. 108 project would be considered an irreversible commitment of these resources during the time that the land is used for the roadway. However, if a greater need for use of the land arises, or if the roadway is no longer needed, the land could be converted to another use. At present, there is no reason to believe that such conversion would ever be necessary or desirable.

A considerable amount of fossil fuels, labor, and roadway construction materials such as cement, aggregate, and bituminous material would be expended. Additionally, large amounts of labor and natural resources would be necessary for fabricating and preparing the construction materials. These materials are generally not retrievable, but they are not in short supply and their use would not have an adverse effect on the continued availability of these resources.

Historic buildings in the study area would be affected by the action alternatives as discussed in Section 4.14, Impacts to Historic, Archaeological, and Paleontological Resources. The demolition of historic buildings as part of construction is considered an irreversible commitment of resources.

Constructing the proposed project would also require a substantial expenditure of irretrievable funds. The commitment of these resources is based on the premise that residents in the area, the state, and the region would benefit from the improved quality of the transportation system. These benefits would consist of improved accessibility, increased safety, and savings in travel time, all of which are anticipated to outweigh the commitment of these financial resources.

4.22.1 Mitigation Measures for Impacts to Irretrievable Resources

Mitigation for the demolition of historic buildings consists of performing an intensive-level site survey, which preserves information about historic structures through documentation. See Section 4.14, Impacts to Historic, Archaeological, and Paleontological Resources, for more information.

4.23 Permits and Clearances

Exhibit 4.23-1 shows the permits and clearances that would be required for the proposed S.R. 108 project. These permits and clearances would apply to both the Minimize 4(f) Impacts and West Alternatives.

Exhibit 4.23-1. Required Permits and Clearances

Permit	Granting Agency(ies)	Applicant	Application Time	Granting Time	Applicable Portion of Project
Section 401 Certification (Clean Water Act)	Utah Division of Water Quality	UDOT	Concurrent with Final EIS	Concurrent with Record of Decision	Required if the project could result in any discharge into navigable waters
Stream Alteration Permit (potentially)	Utah Division of Water Rights	UDOT (prepared by contractor)	Construction phase	Before construction	Required if contractor proposes changes to stream crossing designs
Section 402 Permit (UPDES)	Utah Division of Water Quality	Contractor	Construction phase	Before construction	Stormwater quality during construction phase
Section 404 Permit (Clean Water Act) and Stream Alteration Permit	USACE, Utah Division of Water Rights	UDOT	Prior to construction	Before construction	Portions of roadway in wetlands
Air Quality Approval Order	Utah Division of Air Quality	Contractor	Construction phase	Before construction	Air quality during construction phase (emissions from equipment)
Water Rights (change deed record or apply for change in point of diversion)	Utah Division of Water Rights	UDOT	Right-of-way acquisition phase	Right-of-way acquisition phase	Changes in point of diversion or change of use associated with wells in the right-of-way or water required for wetland mitigation
Section 106 of the National Historic Preservation Act	Utah SHPO, Advisory Council on Historic Preservation	UDOT	Concurrent with EIS	Final EIS	Mitigation of historic and archaeological resources
Memorandum of Agreement	Utah SHPO, Advisory Council on Historic Preservation	UDOT	EIS phase	Final EIS	Impacts on NRHP-eligible properties
Approval of Remediation Work Plan (potentially)	UDEQ or EPA	UDOT	EIS phase	Before construction	Hazardous waste, CERCLIS, and National Priorities List (NPL) sites
Construction-related permits for all of the above (potentially)	Various agencies	Contractor	Contractor	Before construction	Impacts associated with offsite activities such as construction staging, borrow areas, batch plant sites, and so on

All of the listed permits would be required or potentially required under both action alternatives.



4.23.1 Section 401 Certification, Clean Water Act (UDEQ)

EPA is the agency with regulatory authority for Clean Water Act issues at the federal level, but in July 1987, EPA delegated portions of this authority to the State of Utah. UDEQ is the governing agency for issues related to water quality, including the Section 401 certification and the Section 402 NPDES permits.

If the construction or operation of facilities could result in any discharge into a water body, the applicant must request certification from UDEQ that the proposed activity would not violate state or federal water quality standards.

4.23.2 Stream Alteration Permit (Utah Division of Water Rights)

Constructing any new drainage structures at a stream crossing would constitute a major stream alteration or modification. A Stream Alteration Permit from the Utah Division of Water Rights would be required for each stream crossing.

4.23.3 Section 402 Permit, Utah Pollution Discharge Elimination System (Utah Division of Water Quality)

Constructing either action alternative would disturb more than 1 acre and so would require a UPDES construction phase permit. These permits are issued in response to the 1987 reauthorization of the Clean Water Act, which requires EPA to institute an NPDES permitting program for storm drainage systems or to approve state programs. EPA approved Utah's version of this program (UPDES) in 1987.

Obtaining the UPDES permit requires development of a Storm Water Pollution Prevention Plan that includes a Temporary Erosion and Sediment Control Plan. The Temporary Erosion and Sediment Control Plan identifies BMPs as well as site-specific measures to minimize erosion and prevent eroded sediment from leaving the work zone.

4.23.4 Section 404, Clean Water Act, Individual Permit (USACE)

Project applicants are required to obtain a Clean Water Act Section 404 permit if a proposed action would result in the discharge of dredged or fill materials in waters of the U.S., including wetlands. The S.R. 108 project could affect 0.025 acre of wetlands and 1 acre of drainage canals. Consultation with USACE is ongoing to determine if these features are waters of the U.S. If they are considered waters of the U.S., either an individual or nationwide permit could be required.

4.23.5 Air Quality Approval Order (Utah Division of Air Quality)

A permit for air quality impacts during the construction phase is required for both action alternatives. The intent of the permit is to control fugitive dust and emissions. This permit would be obtained by the contractor before construction. It would include requirements for a dust-control plan to address emission sources and possibly other construction approvals depending on the source and location of aggregate, asphalt, equipment emissions, and/or fuel storage facilities.

4.23.6 Water Rights (Utah Division of Water Rights)

Existing groundwater wells within the right-of-way inventoried by the Utah Division of Water Rights are referred to as points of diversion. If the point of diversion is changed (that is, if the well is relocated outside the right-of-way), the owner of the well must file an application with the Division of Water Rights to change the well. If UDOT purchases the water right associated with a well in the right-of-way, the deed record with the Division of Water Rights would have to be changed.



4.23.7 Section 106, National Historic Preservation Act (Utah SHPO and Advisory Council on Historic Preservation)

Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to take into account the effects of their undertakings on historic properties and give the Advisory Council on Historic Preservation a reasonable opportunity to comment. Any property listed in or eligible for the NRHP is considered historic. For the S.R. 108 project, FHWA has consulted with the Utah SHPO and potentially affected Native American tribes and has developed a Memorandum of Agreement for evaluating cultural resources that would be affected by the proposed action and for implementing required mitigation (see Appendix B, Determination of Eligibility and Finding of Effect and Native American Consultation). A permit would be granted to UDOT by the Utah SHPO to perform recovery mitigation on eligible archaeological sites affected by the project. For the S.R. 108 project, UDOT does not anticipate that any archaeological sites would be affected.

4.23.8 Approval of Remediation Work Plan (UDEQ or EPA)

The action alternatives could affect an area with contaminated soils. Construction activities on any contaminated site would require a remediation work plan approved by the appropriate regulatory agency for each site (UDEQ or EPA). The plan would define cleanup levels and protective measures for construction workers.

4.23.9 Construction-Related Permits and Clearances (Various Agencies)

The contractor would be responsible for obtaining all construction-related permits and other environmental clearances for activities occurring outside the right-of-way, such as construction staging areas, borrow areas, and batch plant sites.

4.24 Mitigation Summary

4.24.1 Mitigation Measures for Impacts to Farmland

UDOT will work with each farm owner on a case-by-case basis to determine the farm's eligibility for benefits under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and other state and federal guidelines. Generally, UDOT will provide compensation for the expense of re-establishing farm enterprises and for fair market value of the buildings and land.

4.24.2 Mitigation Measures for Community Impacts

4.24.2.1 Public Health and Safety

If raised medians are incorporated into the final design, the sponsoring agencies will ensure that the locations of the medians will not interfere with emergency service providers' ability to respond to emergencies. Raised medians will also be placed near schools and busy commercial centers so that pedestrians have a relatively safe place to stop when crossing the road.

During the final design of the project, UDOT will coordinate modifications to the existing school crossing zones for Syracuse Junior High School, Syracuse Elementary School, and Syracuse High School with those schools to ensure that roadway improvements maintain student safety at those crossing locations.

During construction, equipment and excavations could pose a safety hazard for students who walk to school on S.R. 108. Before construction begins, the contractor will coordinate with the schools so that appropriate safety measures can be implemented. These measures could include avoiding construction during the morning and afternoon while students are walking to school and providing a safety monitor to watch students as they walk to school near the construction areas.

4.24.2.2 Relocations

The loss of residences or businesses due to either of the action alternatives will be mitigated according to federal, state, and local



relocation policies. Assistance and re-establishment expenses will be provided to the displaced property owners and lease holders according to eligibility requirements and other requirements of the Uniform Relocation Assistance Act of 1970, as amended. Relocation resources will be available to each relocated resident and business without discrimination. UDOT will evaluate the need to provide early right-of-way acquisition for those property owners that demonstrate a hardship because of this project.

If housing of comparable size and value to that being acquired is not available (or is not available within the Uniform Relocation Assistance Act's payment limits), UDOT will invoke a process called "housing of last resort." This process allows necessary replacement housing for relocated homeowners through any of several methods, including:

- Purchasing a comparable residential property and making it available to the relocated person in exchange for the acquired property
- Relocating and rehabilitating (if necessary) a dwelling purchased by UDOT and making it available to the relocated person in exchange for the acquired property
- Purchasing, rehabilitating, and/or constructing additions to an existing dwelling to make it comparable to a particular acquired property
- Purchasing land and constructing a new replacement dwelling comparable to a particular acquired property when comparable dwellings are not otherwise available
- Other measures that fairly compensate for the acquired property

The Uniform Relocation Assistance Act also contains allowances for renters. A one-time rental assistance payment is available that is intended to cover 42 months of rent in a decent, sanitary, safe dwelling. This period could be increased if necessary to fully mitigate affected households. Extensions are considered on a case-by-case basis depending on individual circumstances.

4.24.2.3 Public Services and Utilities

The UDOT document Accommodation of Utilities and the Control and Protection of State Highway Rights-of-Way, Utah Administrative Code Rule 930-6, will be followed. The construction contractor will contact local businesses and residences if any loss of service is required during construction.

4.24.3 Mitigation Measures for Economic Impacts

Although the acquisition of commercial properties could cause an adverse impact on a given business, this impact would not necessarily cause an adverse impact to the area economy. Acquired businesses would be relocated by UDOT according to the Uniform Relocation Assistance Act, as amended; Title VI of the Civil Rights Act of 1964; and 49 CFR 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs. If shoppers continue to want the services provided by a relocated business, the business should be successful at its new location, especially if it is reasonably close to the current location.

4.24.4 Mitigation Measures for Impacts to Air Quality

Because there were no CO impacts associated with either alternative, no mitigation for impacts to CO is required.

For PM₁₀, several mitigation measures will be implemented as part of the proposed project. These measures will include minimizing construction emissions through best management practices and maintaining construction equipment engines.

4.24.5 Mitigation Measures for Noise Impacts

4.24.5.1 UDOT's Noise-Abatement Criteria

This section discusses methods for abating, or reducing, the traffic noise impacts from S.R. 108 that were identified in the previous sections.

According to UDOT's Noise-Abatement Policy (UDOT 08A2-1), noise abatement will be considered for roadway construction projects



where noise impacts are identified. Both of the S.R. 108 action alternatives would add additional lanes of travel, so noise-abatement measures can be considered. The goal of noise abatement is to substantially reduce noise levels, although this noise reduction might or might not result in noise levels that are below the applicable noise-abatement criterion (66 dBA for residential locations).

The two relevant criteria to consider when identifying and evaluating noise-abatement measures are feasibility and reasonableness. Noise abatement will be provided by UDOT only if the noise-abatement measures are *both* feasible and reasonable.

Feasibility

Noise-abatement feasibility deals primarily with construction and engineering considerations. (For example, can noise be substantially reduced at a specific location? Is noise abatement limited by factors such as topography, access requirements, the presence of local cross streets, or other noise sources in the area?)

Under the UDOT noise policy, a noise wall (or other abatement measure) that will not reduce noise by at least 5 dBA for at least 75% of the first-row residences (those closest to the roadway) is not considered feasible.

Reasonableness

Reasonableness is a more subjective criterion than feasibility.

Reasonableness suggests that common sense and good judgment have been applied in arriving at a decision to recommend a noise-abatement measure. (For example, does the noise-abatement measure satisfy the cost criterion established by the noise policy?) As a result, a noise wall could be feasible (that is, provide the minimum required 5 dBA of noise reduction at a majority of the first-row residences), but not be reasonable (for example, by not meeting UDOT's cost criterion).

4.24.5.2 Feasibility and Reasonableness Factors

UDOT considers the following factors, among others, when determining the feasibility and reasonableness of noise-abatement measures:

- **Noise-Abatement Benefits.** Reasonable efforts will be made to substantially reduce noise. UDOT defines a substantial noise reduction as a 10-dBA noise reduction at one first-row receiver adjacent to the proposed alignment. Under the UDOT noise policy, noise walls are considered feasible if they reduce noise by at least 5 dBA at the majority of first-row receivers.
- **Land Use and Zoning.** The existing zoning and land uses adjacent to the transportation facility will be reviewed. In general, noise walls are not consistent with commercial or industrial zoning because businesses usually attract customers by being visible to drivers on the road.
- **Engineering, Safety, and Maintenance.** Engineering, safety, and maintenance issues must be considered to determine the constructability of a noise-abatement measure. If any of these issues are substantial enough to preclude good safety and maintenance practices, then the noise wall might not be feasible.
- **Cost of Abatement.** In residential areas, all residences affected by the proposed project must be considered in determining a noise wall's cost effectiveness. Under UDOT policy, a benefiting residence is one at which noise is reduced by at least 5 dBA as a result of the noise wall. The maximum cost used to determine the reasonableness of a noise-abatement measure is \$30,000 per benefiting receiver based on a noise wall cost of \$20 per square foot.
- **Public Involvement and Balloting.** The UDOT Project Manager, Public Involvement Coordinator, and Environmental Engineer/Manager will decide on the appropriate level of public involvement. The purpose of the public involvement process is to ensure that the concerns of the affected communities are known and that every effort is made to provide noise abatement to an affected community.
- **Abatement Design.** A noise-abatement measure must be designed with the following considerations in mind: (1) good design practice, (2) optimal performance, and (3) current highway safety technology. UDOT will consider aesthetics treatment, graffiti deterrence, and landscaping where appropriate



in relation to design standard specifications, cost efficiency, maintenance, and the regulations of local municipalities.

Once a noise wall has been determined to be feasible, UDOT will determine whether its construction is reasonable by thoroughly considering the range of factors described above, including the cost-effectiveness of the measure. UDOT will construct noise walls only if they have been determined to be both feasible and reasonable. The decision to recommend or not recommend a noise wall is the responsibility of the UDOT Environmental Engineer/Manager with concurrence from the Project Manager and the Preconstruction Engineer. For projects with federal involvement, FHWA will have final approval for noise-abatement measures.

4.24.5.3 Noise-Abatement Methodology

The effectiveness of noise walls is generally limited to areas within about 500 feet of the proposed right-of-way. Beyond this distance, noise walls do not effectively reduce noise levels at individual residences. In addition, noise walls are most effective where they are continuous and block a number of individual residences. The short spacing between individual residences and driveways, as well as the need to maintain access along S.R. 108, make noise walls infeasible in Segments 1 through 7 of S.R. 108.

Noise walls were considered for two mobile-home parks in Segment 8 and for townhomes adjacent to the alignment in Segment 9. Four noise walls were considered adjacent to Karol's Mobile Estates and the Country Meadows Estates, and two noise walls were constructed adjacent to the townhomes in Segment 9. The results of the evaluation are summarized below. Beginning on page 4-106, Exhibit 4.10-19 through Exhibit 4.10-24, Noise Mitigation Analysis, show the abatement evaluation for each noise wall that was considered. The locations of potential noise walls are shown in Exhibit 4.10-17: Noise Receptor Locations – Segment 8, R8-1 to R8-41 and Exhibit 4.10-18: Noise Receptor Locations – Segment 9, R9-1 to R9-13 on pages 4-104 and 4-105.

For each noise wall considered, the feasibility and reasonableness of wall heights between 6 feet and 18 feet were evaluated to determine the following:

- The number of noise-impacted residences that would benefit from the noise wall (those at which noise would be reduced by at least 5 dBA)
- The maximum noise level reduction from the noise wall (the degree to which a noise wall could reduce noise by at least 10 dBA as required by UDOT's Noise Policy)
- Whether at least 75% of first-row residences would benefit from the noise wall
- The cost-effectiveness of the noise wall (cost per benefiting residence)

An overall determination of whether the noise wall is both feasible and reasonable (cost-effective)

4.24.5.4 Noise-Abatement Measures

Segment 8 (4000 South to 3600 South)

Four noise walls were considered in Segment 8, and all four were considered feasible and reasonable. Residents who are adjacent to the proposed noise walls will be able to vote on whether they want the noise walls to be built. If residents are in favor of noise walls, they will be constructed.

- **Wall 1** (about 550 feet long) was located on the southeast side of Karol's Mobile Estates. A noise wall 16 feet high at this location would reduce noise by 4 dBA to 12 dBA at the majority of first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-19: Noise Mitigation Analysis – Wall 1 on page 4-106.
- **Wall 2** (about 300 feet long) was located on the northeast side of Karol's Mobile Estates. A noise wall between 12 feet and 18 feet high would reduce noise by up to 6 dBA at the majority of first-row residences. A noise wall in this location would be feasible and reasonable according to UDOT's noise-abatement criteria.



For more information, see Exhibit 4.10-20: Noise Mitigation Analysis – Wall 2 on page 4-107.

- **Wall 3** (about 400 feet long) was located on the south end of the Country Meadows Estates. A noise wall between 12 feet and 18 feet high would reduce noise by 9 dBA to 12 dBA at first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-21: Noise Mitigation Analysis – Wall 3 on page 4-108.
- **Wall 4** (about 425 feet long) was located on the north end of the Country Meadows Estates. A noise wall between 12 feet and 18 feet high would reduce noise by 7 dBA to 13 dBA at first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-22: Noise Mitigation Analysis – Wall 4 on page 4-109.

Segment 9 (3600 South to 1900 West)

Two noise walls were considered in Segment 9, and both were considered feasible and reasonable. Residents who are adjacent to the proposed noise walls will be able to vote on whether they want the noise walls to be built. If residents are in favor of noise walls, they will be constructed.

- **Wall 5** (about 360 feet long) was located adjacent to the relatively new townhome development on the south side of the alignment. A noise wall 8 feet high at this location would reduce noise by about 5 dBA to 9 dBA at the majority of first-row residences and would be feasible and reasonable according to UDOT's noise-abatement criteria. For more information, see Exhibit 4.10-23: Noise Mitigation Analysis – Wall 5 on page 4-110.
- **Wall 6** (about 950 feet long) was located on the south side of the alignment adjacent to the townhome development. Similar to Wall 5 described above, a noise wall 8 feet high would reduce noise by 6 dBA to 10 dBA at the majority of first-row residences. A noise wall in this location would be feasible and reasonable according to UDOT's noise-abatement criteria. For

more information, see Exhibit 4.10-24: Noise Mitigation Analysis – Wall 6 on page 4-111.

4.24.6 Mitigation Measures for Water Quality Impacts

4.24.6.1 Mitigation Measures for Water Quality Impacts due to Construction

A UPDES permit will be required if construction disturbs more than 1 acre. This permit will require the use of best management practices (BMPs) to prevent sediments and other contaminants from leaving the construction site.

4.24.6.2 Mitigation Measures for Surface Water Impacts

Detention features will be provided where the capacity of the existing stormwater system is inadequate to convey the additional runoff flows or where the expected impact to the water quality of receiving waters requires flows to be detained and water treated. In addition to reducing peak levels and velocities in streams, detention ponds have the added benefit of reducing contaminant levels of TSS, TDS, and the metals present in highway runoff.

4.24.7 Mitigation Measures for Impacts to Wells or Points of Diversion

During the final design of the project, UDOT will work with the property owner to determine the appropriate mitigation measure if a well head or other water right point of diversion is affected. Mitigation could include (1) relocating a well head or surface water diversion to continue to provide irrigation water to any land that is not acquired or (2) abandoning the well and compensating the owner for the value of the associated water right.

4.24.8 Mitigation Measures for Ecosystem Impacts

To mitigate any construction impacts to the small, isolated jurisdictional wetland, appropriate BMPs will be incorporated into the construction plan. Environmental fencing will be installed to prevent construction equipment impacts, along with installing silt



fencing to control sedimentation of the wetland. Any mitigation to the 0.025 acre of wetlands and the ditches parallel to the alignment will depend on the jurisdictional status and the type of permit requested as determined by USACE. However, no mitigation is anticipated for impacts to the ditches. No mitigation will be required for impacts to disturbed or urbanized lands.

4.24.9 Mitigation Measures for Impacts to Historic, Archaeological, and Paleontological Resources

Mitigation measures for adverse effects to historic buildings will be necessary under either action alternative. The exact mitigation measures would be negotiated between FHWA, UDOT, the Utah SHPO, and interested parties through the Section 106 process of the National Historic Preservation Act. These measures would be determined by historic protection experts to mitigate the impacts to these resources to the greatest extent feasible. A Memorandum of Agreement has been developed between FHWA and the Utah SHPO (UDOT is an invited signatory) outlining the specific mitigation measures to be implemented if an action alternative is selected in the Record of Decision for the project.

4.24.10 Mitigation Measures for Impacts to Hazardous Waste Sites

Measures will be implemented to prevent the spread of contamination and to limit worker exposure. Site investigations will determine the chemical hazard, if any, and the appropriate protective measures. In the case of an identified chemical hazard, the site remedy will be negotiated with the property owner prior to property acquisition and through the possible coordination with DERR.

Previously unidentified sites or contamination could be encountered during construction. In such a case, all work will stop in the area of the contamination according to UDOT Standard Specifications, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous wastes will be handled according to UDOT Standard Specifications and the requirements and regulations of DERR.

At the time of construction, coordination will take place between UDOT or DERR, the construction contractor, and the appropriate property owners. This coordination will involve determining the status of the sites of concern, identifying newly created sites, identifying the nature and extent of remaining contamination (if any), and minimizing the risk to all parties involved. Environmental site assessments will be conducted at the sites of concern to further evaluate the nature and extent of contamination and to better identify the potential risks of encountering hazardous waste when constructing the selected alternative.

4.24.11 Mitigation Measures for Visual Impacts

During the preliminary design of the project, several mitigation measures were considered to reduce the visual impacts of the alternatives. Additional aesthetic measures such as lighting, vegetation and plantings, and other architectural features will be considered during the final design of the project. Landscape plans for the roadway will include replacement landscaping to reduce impacts from the loss of vegetation.

4.24.12 Mitigation Measures for Construction Impacts

The following mitigation measures will be implemented during construction.

4.24.12.1 Mitigation Measures for Public Impacts Due to Construction

A thorough public information program will be implemented to inform the public about construction activities and to minimize impacts. Information will include work hours and alternate routes. Construction signs will be used along the corridor to notify motorists about work activities and changes in traffic patterns.

Impacts from lights used during nighttime construction will be minimized by aiming construction lights directly at the work area and/or shielding the lights. Utility agreements will be completed to coordinate utility relocations.



4.24.12.2 Mitigation Measures for Air Quality Impacts due to Construction

The contractor will be required to provide the following mitigation measures to preserve air quality during construction:

- **Fugitive-Dust Control.** The contractor will maintain a fugitive-dust-control program. This program will include wetting excavation areas, unpaved parking and staging areas, and onsite stockpiles of debris, dirt, or dusty material to reduce windblown dust.
- **Street Sweeping.** The contractor will use street-sweeping equipment where needed.
- **Equipment Emissions.** The contractor will shut off construction equipment when it is not in direct use to reduce emissions from idling.

Other mitigation measures that could be implemented to minimize air quality impacts include the following:

- Use newer, cleaner-emitting construction equipment and properly maintain the equipment.
- Install control equipment on diesel construction equipment (such as particulate filters or traps, oxidizing soot filters, and oxidation catalysts) to the extent that is feasible.
- Reroute truck traffic away from schools and communities when reasonably practical.
- Consider the use of alternate engines and diesel fuels such as electric engines, engines that use liquefied or compressed natural gas, diesel engines that meet EPA 2007 regulations, diesel engines fueled with low-sulfur fuel, and diesel engines outfitted with catalyzed diesel particulate filters and fueled with low-sulfur fuel (less than 15 ppm sulfur).

4.24.12.3 Mitigation Measures for Water Quality Impacts due to Construction

To minimize the temporary impacts to water quality, a UPDES General Storm Water Discharge Permit will be required. As part of the requirements of the permit, the contractor will be required to develop and implement a Storm Water Pollution Prevention Plan.

The plan will contain provisions for controlling the stormwater in the project area to reduce erosion and siltation.

4.24.12.4 Mitigation Measures for Noise Impacts due to Construction

To reduce temporary noise impacts associated with construction, the contractor will comply with all state and local regulations relating to construction noise. Measures for reducing construction noise include limiting construction in residential areas during nighttime hours, locating rock-crushing activities away from residential areas, and placing temporary barriers. Each construction area will be evaluated for the appropriate measures to use.

4.24.12.5 Mitigation Measures for Visual Impacts due to Construction

The contractor will prepare and implement an appropriate seeding vegetation and/or landscaping plan to restore or enhance aesthetics at the completion of the project. The contractor will also be required to maintain and keep the storage area for equipment, materials, and other accessories in a reasonable condition of cleanliness and orderly placement to avoid an unpleasant appearance. The contractor will promptly remove unused or unnecessary traffic-control equipment.

4.24.12.6 Mitigation Measures for Utility Service Impacts due to Construction

The project specifications will require the contractor to coordinate with the utility companies to plan work activities so that utility disruptions to a business occur when the business is closed or during off-peak times. Before beginning work, the contractor is required to contact Blue Stakes to identify the location of all utilities. The contractor will be required to use care when excavating to avoid unplanned utility disruptions. If utilities are unintentionally disrupted, UDOT will work with the contractor and the utility companies to restore service as quickly as possible.

4.24.12.7 Mitigation Measures for Traffic Impacts due to Construction

The contractor will be required to develop a maintenance of traffic plan that defines measures to minimize construction impacts on



traffic. A general requirement of this plan is that, to the extent reasonably practical, safe access to businesses and residences must be maintained and existing roads must be kept open to traffic unless alternate routes are provided. However, prior to construction of each phase, the project team will coordinate with business and property owners to identify where temporary access can be shared and to define timeframes (such as night) when access is not needed. Signs will be placed to notify motorists where business access is provided. Finally, information will be made available to the public detailing construction activities and providing alternate transportation routes.

Even with the implementation of the maintenance of traffic plan, short-term increases in traffic congestion would occur in the vicinity of S.R. 108 construction. Street closures would be limited to what is specified in the maintenance of traffic plan as approved by UDOT before the start of construction.

4.24.12.8 Mitigation Measures for Economic Impacts due to Construction

Access to businesses will be maintained during the construction and post-construction phases of this project, as this is UDOT's policy with respect to access issues on all UDOT roadway improvement projects. For each phase of the project, the project team will coordinate with property owners and businesses to evaluate ways to maintain access while still allowing efficient construction operations. This could entail sharing temporary access or identifying acceptable timeframes when access is not needed. Adequate signage will be placed in construction areas to direct motorists to businesses and industrial areas. Other potential mitigation measures for construction impacts include:

- Provide a frequent newsletter to all businesses along S.R. 108 describing the progress of the construction and upcoming construction events.
- Provide business access signs along S.R. 108 that identify business access points within the construction limits.
- Hold a monthly meeting with business owners to inform them of upcoming construction activities and to provide a forum for the businesses to express their concerns with the project.

- To minimize noise and light impacts at night, conduct major construction activities in residential areas during the day.

4.24.12.9 Mitigation Measures for Hazardous Materials Impacts due to Construction

To minimize the risk of exposure to hazardous materials, the UDOT project team will coordinate with DERR, the construction contractor, and the appropriate property owners. This coordination will involve determining the status of the sites of concern, identifying newly created sites, identifying the nature and extent of remaining contamination (if any), and minimizing the risk to all parties involved.

Measures will be implemented to prevent the spread of contamination and to limit worker exposure. Site investigations will determine the chemical hazard, if any, and the appropriate protection measures. In the case of an identified chemical hazard, the site remedy will be negotiated through coordination with DERR.

Previously unidentified sites or contamination could be encountered during construction. In such a case, all work will stop in the area of the contamination according to UDOT Standard Specifications, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous wastes will be handled according to UDOT Standard Specifications and the requirements and regulations of UDEQ.

4.24.12.10 Mitigation Measures for Construction Staging and Material Borrow Areas

Earth-disturbing activities are generally confined to the limits of cut and fill, although staging areas and some construction activity might be located outside the limits of cut and fill. Any staging areas or construction fill material areas will need to be coordinated with UDOT to ensure that no sensitive environmental resources are affected. The contractor will limit impacts and restore any disturbed vegetation or other improvements within the selected staging areas.



4.24.12.11 Mitigation Measures for Invasive Species Impacts due to Construction

To mitigate the possible introduction of invasive weeds due to construction activities, the invasive weed BMPs in UDOT's current Standard Specifications for Road and Bridge Construction will be implemented and monitored and included in the plans and specifications for the project.

- The contractor will be required to follow noxious weed mitigation and control measures identified in UDOT Standard Specifications for Invasive Weed Control.
- Strictly following BMPs will also reduce the potential for weed infestations.
- Reseeding with native plants, followed by monitoring seedlings and invasive species until the vegetation has re-established, will mitigate direct-disturbance impacts and reduce the potential for weed invasions. UDOT will be responsible for monitoring and determining when vegetation becomes re-established.

4.24.13 Mitigation Measures for Impacts to Irretrievable Resources

Mitigation for the demolition of historic buildings consists of performing an intensive-level site survey, which preserves information about historic structures through documentation. See Section 4.14, Impacts to Historic, Archaeological, and Paleontological Resources, for more information.